

# Project WISE (Watersheds Inspiring Student Education) 2006-2007 NOAA-BWET

## Section A

### Organization

- Golden Gate National Parks Conservancy
- Crissy Field Center

### Project Title

Project WISE (Watersheds Inspiring Student Education), Meaningful Watershed Experiences, Powerful Learning Opportunities for Students in the Presidio of San Francisco

### Priority Area

Meaningful Watershed Experiences for Students

### Partners

- Core Partners:
  - Urban Watershed Project
  - Galileo Academy of Science and Technology
- Partners
  - National Park Service
  - Presidio Trust
  - San Francisco Unified School District
  - San Francisco State University
  - University of California, Berkeley
  - Center for Cities and Schools, UC Berkeley

### Target Audience

#### Demographics (year-long program)

During the 2006-2007 time period, Project WISE worked with two primary groups of students: 1) the year-long program with 50, 11th and 12th grade inner city high school students, and 2) the short course sessions.

African American – 19%  
Latino – 26%  
Asian – 12%  
Caucasian – 14%  
Other (non-white) – 22%  
Mix race – 7%

## Section B

### Goals and Objectives

•Provide 200 diverse, low-income San Francisco urban high school students (grades 10-12) with meaningful watershed experiences in the Presidio of San Francisco and Gulf of the Farallones National Marine Sanctuary.

•Create opportunities for students and teachers to apply scientific principles, monitor natural resources, restore degraded environments, map the Tennessee Hollow watershed, contribute over 1600 hours of public service.

•Afford students and teachers with hands-on training in the scientific method, including scientific protocols, making observations, gathering and analyzing data, drawing conclusions and reporting findings. Develop high-level technical and professional student skills and competencies, including water sampling, GPS/GIS monitoring and mapping, and species identification.

•Empower students to be curious and to think critically regarding scientific findings. Demonstrate how inquiry is an important tool in building knowledge.



### Goals and Objectives (continued)

•Develop student understanding of basic watershed processes, San Francisco Bay marine ecology and biodiversity within the Gulf of the Farallones National Marine Sanctuary.

•Raise student ability to speak publicly and encourage them to share their experiences and knowledge with others, to build personal self-confidence and civic awareness.

•Steward the Tennessee Hollow watershed, improve water quality and enhance overall ecosystem health through student projects aligned with actual restoration goals identified by land managers.

•Encourage students to be secure in the out-of-doors, to choose internships and other environmental program opportunities at the Crissy Field Center and in the National Park.

•Make students aware of academic and career tracks in the environmental sciences.

•Sustain and replicate the environmental science program in other appropriate locations within the Gulf of the Farallones National Marine Sanctuary with other schools and partners.

### Project Overview

Watersheds Inspiring Student Education (WISE) is a place-based program engaging 200 diverse high school students in the education, enhancement and restoration of Tennessee Hollow watershed in the Presidio of San Francisco. WISE connects urban youth with meaningful watershed experiences by enabling active, constructive participation in stewardship and restoration activities. Students conduct hands-on, investigative projects and present their findings to peers, land managers and others; giving the youth a genuine sense of responsibility and accountability.

Through the course of the year, WISE participants learn about the significance of watersheds and biodiversity, and practice scientific methods in the field, lab and classroom. Field studies take place in the Tennessee Hollow watershed, a 271-acre area in the eastern portion of the Presidio. This basin drains fresh, spring water through remnant riparian habitat to the Crissy Field marsh, the San Francisco Bay and ultimately, the Gulf of the Farallones National Marine Sanctuary.

### Outdoor Experiences

Two 25-student classes come to the Crissy Field Center on the Presidio of San Francisco once a week for 2 1/2 hour sessions. The two classes spent over 95 hours in the National Park researching and stewarding local watersheds and protected the Pacific Ocean and the Gulf of the Farallones Sanctuary. Sessions covered water quality, watershed analysis, air quality testing, geology and plant identification. Final projects made up the majority of the second semester, concluding with an Environmental Science Symposium.

In the **water quality unit** students worked on a 3 week analysis of the Presidio's Tennessee Hollow creeks. Students analyzed temperature, pH, dissolved oxygen, TDS, conductivity, salinity, nitrates and phosphates. They conducted a stream bioassessment of benthic macroinvertebrates and a habitat assessment utilizing the California Fish and Wildlife protocol. Each week they made predictions, created a hypothesis, analyzed the data and wrote up results. Student data was added to the data collected by park scientists and assists with the long term monitoring of the watershed.



### Outdoor Experiences (continued)

Students compared and contrasted the Presidio Creeks to Redwood Creek in **Muir Woods**, followed the Redwood Creek to the ocean. The WISE team developed an upbeat Muir Woods audio tour with worksheet. With the money from NOAA we were able to purchase audio players, downloaded our podcast and students were able to borrow these materials for the trip. Originally we had asked NOAA for money for IPODs but realized that these were really not necessary and instead purchased digital audio players which worked extremely well. Students who did not have their own IPOD device were able to use the players.

### Final Projects

The first semester and part of the second semester provide the building blocks for the final project segment of the program. Throughout the year students work on developing hypotheses, practice analyzing data, get comfortable working with a team and become familiar with the Presidio and a variety of topics.

Students were offered a wide choice of topics. In teams of 3 they worked together to develop the topic, write a proposal, conduct the study, analyze their results, write a scientific paper, develop a presentation and ultimately present in the symposium. One group became fluent in the use of a spectrophotometer during the water quality testing that they did for their final project. Other groups mastered using transects and quadrats. Another group developed an eye in identifying echelon faults from satellite images. Each group walked away with unique skills in addition to the required skills (such as background research, data collection, scientific method protocol, GPS mapping, graphing results, Power Point and presentation skills).

This year we had excellent park staff and public attendance to the symposiums. Students conducted 11 projects and experiments covering the following topics:

- Butterflies in the Tennessee Hollow watershed
- Natural and built brush pile monitoring
- Himalayan Blackberry
- Spiders of Inspiration Point
- Water Quality in the Crissy Field Center (source Lobos Creek)
- Geologic Forces that shaped the SF Bay watershed
- Invasive species eradication- French Broom
- Invasive species eradication- Mattress Wireweed
- Invasive species eradication- cape and English ivy
- Raptor nest height
- Composting in the national park

### Evaluation Plan

An evaluation study was completed by San Francisco State University to obtain evidence-based information for this experiential program. Program managers and teachers wanted to know more about the students' scientific/technical skill development as well as if and how their personal/social skills are enhanced.

Data were collected from February through July 2007 and included resources from previous years. Thirty-five students completed the 2006-07 program. Five approaches included a mid-semester questionnaire, year-end survey, program and presentation observations, review of testimonials from previous years, and intermittent interview procedures occurred with three instructors. Information gathered was used to determine if and how students acquire technical skills relating to scientific inquiry as well as verify whether students build personal self-confidence and develop a sense of stewardship for the Golden Gate National Parks.



## Section C

### Products

•We utilized the online program "**Google Docs**" which allowed us to capture all of the student work online. Students could access their work at school, home or at the Crissy Field Center. If someone was absent, the work was still available online and the other team members were able to continue working on it. This tool allowed us to view student work, add comments, edit and keep track of all drafts of their work. Their reflections, water quality and air quality papers and final project papers were all completed stored and available online in Google Docs. Grading was conducted on a Google Docs spreadsheet. Students were able to easily track their work, see what was missing, etc. Easy access made students more accountable for their work and improved participation.

•Student data on a variety of subjects

- Water quality, Air quality, Insects, Geology, Raptors, Invasive Species Eradication, Composting

•Student teams of three wrote scientific papers detailing the project of their choice. The paper content included: Purpose, Hypothesis, Data, Analysis, Conclusions, Recommendations, References.

•Student final presentations were captured on video tape.

•2006-2007 Project Evaluation by San Francisco State University

### Results/Lessons Learned

#### Unique Results

•Results show the core of student learning is not so much in the information, but in the interaction between these youth and the natural environment.

•While science taught contributes to meeting school standards, and definitely enhances student knowledge, the imagination being developed through involvement in Project WISE and their national park visits may be more important than technical precision.

#### Evaluation Results

•92% of students completing the year-end survey agreed or strongly agreed they gained a greater understanding of the natural history of the Presidio while 88% agreed in some capacity to gaining a basic understanding of the watershed process in the Tennessee Hollow watershed from their participation in Project WISE.

•Field trips have a significant level of importance and value in the students' learning experience and contributed to their comprehension of both science and stewardship.

•Nearly 3/4 agreed their perspectives about science have positively changed due to their experience in the program.

•The majority of all students indicated they have an improved ability to work in a team and have experienced a new connection with nature.

#### Changes to Evaluation Plan

The evaluation plan remains largely unchanged with the exception of more rigorous surveys completed at the beginning, middle and end of the program. In addition, more in-depth tracking interviews are being conducted as a way to tease out detailed information that written surveys are unable to capture.

#### Changes made to Project

The WISE Project has added an additional class to add breadth and depth to the program. The class is a full year opportunity internship where students are exposed to job-related experiences. Outdoor experiential learning remains an integral part of the program. Added are lessons on job hunting, interview skills and resume writing. We focus on an actual internship within the Golden Gate National Park with professional staff. This additional class provides a stepping stone for students to get more involved in the environmental field with the goal of eventual employment in the natural resources area.

